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*Whitham modulation theory for a class of nonlinear dispersive
wave equations*

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Abstract: Nonlinear periodic waves are central to a wide array of physical systems, from fluid dynamics to optics, where their stability and behavior under slow modulations reveal complex multiscale dynamics. This talk will explore the application of Whitham modulation theory, an asymptotic procedure that results in a system of conservation laws governing the slow evolution of wave parameters in nonlinear periodic wavetrains. Although modulation equations can, in principle, be derived for a general nonlinear, evolutionary model, they often become intractable when explicit formulas for periodic solutions are unavailable. We will discuss the Whitham modulation equations for a general class of dispersive hydrodynamic model equations and examine how their properties can be studied asymptotically and numerically. Special attention will be given to how this approach can provide practical insights into the stability of periodic traveling waves.

Thursday, November 21, 2024, 10:00 am
Mathematics and Science Center: MSC N306

MATHEMATICS
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